

FLORIDA EXTENSION INITIATIVE 2:  
ENHANCING AND PROTECTING WATER QUALITY, QUANTITY, AND SUPPLY  
STATEWIDE EDUCATIONAL PROGRAMS IN **WATER QUALITY AGRICULTURE**

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## SITUATION

Florida has a wide diversity of water resources with 54,836 miles of rivers and streams, 49,128 miles of canals and ditches, over 1.8 million acres of lakes, reservoirs, and ponds, more than 1,000 springs, 11 million acres of wetlands and 1,350 miles of coastal shoreline. Many of these water resources are downstream of watersheds where approximately 19 million people live and the land is used for agriculture, silviculture, industrial and other intensive land uses. High annual rainfall and extreme weather events increases the hydrologic connectivity between land based activities and downstream water resources. Florida's subtropical and warm temperate climate, extensive sunlight and often shallow waterbody depth can further exacerbate the impact of contaminants that enter these waters.

Florida's 2012 Integrated Water Quality Assessment Report conducted by the Florida Department of Environmental Protection, identified 19.5% of the state's surface waters were impaired by pathogens, 13.1% impaired by nutrients and virtually all, 91.8% impaired by mercury relative to their designated uses. An additional number of surface water bodies, 44.6% for pathogens and 62.3% for nutrients, have insufficient data at this time to determine if these waters are within acceptable levels to maintain their designated use. With regard to groundwater, the states trend monitoring network indicate some localized nitrate impacts as well as increasing trends for saltwater encroachment mainly in coastal areas.

Progressive and reactive efforts by state and local agencies to address water quality issues in the context of the Federal Clean Water Act and state and local mandates have resulted in a complex and often contentious suite of protective standards (Numeric Nutrient Criteria), impaired water mitigation targets and strategies (Total Maximum Daily Loads, Basin Management Action Plans and Best Management Practices) and local regulations (Local Fertilizer Ordinances).

Agricultural stakeholders, as compared to urban stakeholders, manage large land areas that typically require inputs of nutrients and other potentially contaminating chemicals of aquatic systems in an effort to maintain profitability and meet buyer expectations. Recommendations to best manage these inputs and minimize losses are extensive, but often reliant on the agricultural stakeholder for adoption and long-term management. Adoption of practices in some watersheds that already show impairment are required or the agricultural operation must show through monitoring that they are in compliance. However, because many of these practices have no net economic benefit to the agricultural stakeholder and in most instances will be a cost that cannot be passed on to the buyer, there is often resistance to adopting and or less than optimal management of at least some of the practices and questions related to the science behind regulatory actions and sources of waterbody impairment arise. Therefore, other compelling reasons to adopt and maintain these best management practices, and to address stakeholder's questions, need to be identified and promoted.

Extension is uniquely qualified to facilitate this discussion and address questions mainly due to a level of trust that has developed between agricultural stakeholders and extension over many years. Extension also typically understands both the agricultural constraints in adopting best management practices as well as the sensitivity of aquatic ecosystem to potential contaminant loading and the often complex science used to determine protective thresholds of public water resources. Working with stakeholders so that they are aware and adopt various practices that are known to be effective in reducing impacts on water quality, and increasing their overall

understanding of the impact degraded water quality has on economic and environmental resources is critical yet presently limited relative to the need for this information.

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## PROGRAM OBJECTIVES

The overarching objectives of this program are to: 1) increase awareness by agricultural stakeholders of the connectivity and potential impacts agricultural activities can have on water quality at the watershed scale, 2) help clarify and address questions related to state and federal water quality programs affecting Florida agriculture and 3) increase adoption and optimize management and maintenance of commodity specific water quality BMPs.

In the long-term, the outcome of this program will reduce water quality impacts from agricultural land uses to the extent required in watersheds already known to be impaired (TMDL watersheds). In unimpaired watersheds, this program will minimize agricultural impacts on water quality to the extent possible so that agricultural loads in these watersheds will not result in impaired conditions in the future.

In the short to medium-term, target outcomes for this program area are as follows:

- 1) All Agricultural stakeholders within TMDL watersheds will either adopt existing commodity specific BMPs or develop monitoring programs that show equivalent loading levels of their operation similar to those that have adopted BMPs.
- 2) Voluntary implementation of BMPs in non TMDL watersheds will increase by 25% relative to preprogram levels.
- 3) Willingness to maintain and properly manage BMPs will increase by 70% for those stakeholders participating in the program.
- 4) Understanding of agricultural land use connectivity and potential impacts on water quality associated with agricultural operations and associated ecological and economic impacts will increase by 75% for those stakeholders participating in the program.
- 5) Understanding by agricultural stakeholders of various regulatory programs that the state and federal government uses to protect public water resources will increase by 75% for those participating in the program.

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## EDUCATIONAL METHODS

There are two method focus areas to achieve the stated objectives with stakeholders; 1) BMP Education Programs and 2) a Water School for Agricultural Stakeholders by Basin. In addition, there is an In-Service Training component as part of this program as well.

BMP Education Program – The state has been divided into 10 area teams roughly along BMAP lines with each area containing 2 to 3 current or potential BMAPs. Agents participating in BMP programs within these area teams will be updated on FDACS, FDEP and USEPA policies, BMP implementation efforts and any applicable cost share programs. Periodic in-service training will keep agents informed on latest research and BMP efficacy. BMP Education Programs will work with commodity specific agricultural stakeholders to assist in understanding the proper operation and maintenance of BMP practices and update growers on new research related to efficacy and optimization of practices. Although regular training is not presently a requirement under the NOI, communicating results of efficacy studies and refinement of BMPs to improve their effectiveness is critical to minimizing water quality impacts and costs.

Implementation of the BMP Education Program will include Area Team specific in-service training for agents and workshops for growers including the following topics:

- Updates on FDACS implementation efforts including enrollment information by commodity and area as available. Access to the FDACS BMP enrollment database will be provided to to enable agents to assist growers not inrolled in applicable BMP programs.

- Available information on FDEP monitoring programs for growers not enrolled in the BMP program will be provided.
- Summaries of area team programs will be discussed by leadership and conveyed to agents in other areas.
- Discussion and basis of state and federal programs related to water quality.
- Programs for growers with state specialists on BMP principles and research results will be made available to the area teams. Grower success stories will be developed for distribution and discussion to emphasize the implementation and efficacy of specific BMPs.

Water School for Agricultural Stakeholders by Watershed – Similar to other water schools developed for decision makers in Florida, a Water School for Agricultural Stakeholders by Watershed would: 1) provide a watershed context within which agricultural water consumption and water quality discharge takes place, 2) raise awareness of the economic and ecological benefits associated with implementing and maintaining water quality BMPs to minimize contaminant loading and 3) promote a “shared water ethic” to change BMP implementation incentive away from regulatory driven and instead become self-motivating in an effort to be better water resource managers.

Implementation of the water schools will include watershed specific workshops including the following topics:

- Water and nutrient cycling within the environment and specifically within the target watershed.
- A discussion of ecosystem services within the watershed and potential impacts to those services resulting from water quality degradation.
- Highlighting various agricultural activities and commodities that occur within the target watershed with specific reference to water quality requirements. For instance, the Suwannee River Watershed would highlight possible impacts of excess nutrients and water consumption on clam farmers or fisheries downstream in Cedar Key.
- Any existing water quality issues within a watershed and how agricultural operation may be contributing to loads.
- Discussion and basis of state and federal programs related to water quality.
- Discussion of specific practices and methods to improve water quality including BMPs and irrigation methods highlighting case studies, success stories within the basin and innovative new technologies that might be applicable.

The program would also use field trips within a particular target watershed to highlight the following:

- Different agricultural operations within the basin identifying possible water quality and quantity connections and interactions.
- Aquatic ecosystems within the watershed and identify the potential impacts to these systems and ecosystem services if water quality is or becomes degraded.

In addition, an In-Service Training covering similar information provided in the water school will be offered to extension faculty. This In-Service Training will help local county agents better understand the potential connections between agricultural stakeholders and water quality issues so that they can reinforce information provided in the water school workshops and field trip activities.

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## RESULTS

Success of the program will be based on the following metrics, which differ depending on the outcome time frame.

For knowledge gained and willingness to implement or change practices; traditional pre/post testing will be used to assess program objective.

To assess improved implementation effectiveness of BMPs pre post surveys will be conducted in association with BMP Education Programs and a follow up survey 6 and 12 months after the BMP education program will be conducted to determine if changes in BMP maintenance or implementation have changed.

Long-term water quality impacts of the program will be assessed using Basin Management Action Plan implementation reports and monitoring results for those basins that are trying to meet TMDL targets. In basins that

are not already impaired, trends in water quality as monitored by the Florida Department of Environmental Protection for compliance with designated uses will be used to determine if any increase in contaminant loads is evident.

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## NEEDS

Successful implementation of this program will depend on and or benefit significantly from the following constraints being addressed.

- Focusing on the watershed scale, as this programs objectives intend, will require extension to move beyond traditional political/county boundaries administratively and for county agents to cooperate along watershed boundaries.
- Funding will be required for educational programs and assessment effort.
- Coordination among various agencies, extension and agricultural commodity groups will be required.
- Willingness of agricultural stakeholders to participate in the program will be required. One way to incentivize this would be to include a continuing education component as a BMP in all commodity BMP manuals. This program could be organized to provide CEU's for that purpose.
- In some instanced, inter-state coordination and cooperation would be required to effectively address those agricultural stakeholders that are in watersheds that cross state boundaries.
- Better coordination between state and county faculty to better identify local issues and opportunities to highlight production systems.

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## SUPER ISSUES

- ❖ Awareness and appreciation of food systems and the environment.
- ❖ Resource sustainability and conservation in Florida communities.